

13. (AMENDED ONCE) A method to solve via poisoning for insulative porous low-k materials in a dual damascene structure comprising the steps of:

providing a substrate having a passivation layer formed over a first metal layer formed on said substrate;

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forming a first insulative layer over said substrate;

forming an etch-stop layer over said first insulative layer;

forming a second insulative layer over said etch-stop layer;

forming a first photoresist layer over said second insulative layer and patterning said photoresist to form a first photoresist mask having a hole pattern;

etching said first and second insulative layers, including said etch-stop layer through said hole pattern to form a hole reaching said passivation layer;

removing said first photoresist mask;

forming a low-k protection layer over said substrate, including in said hole opening;

forming a second photoresist layer over said substrate, including said hole opening and patterning said second photoresist to form a second photoresist mask having a trench pattern; .

etching said second insulative layer through said trench pattern in said second photoresist mask to form, a trench in said second insulative layer, thus completing the forming of said dual damascene structure in said substrate;

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Cont.

removing said second photoresist mask;

removing said low-k protection layer from over said substrate and from the bottom of said hole opening and thereby exposing underlying said passivation layer while leaving said low-k protection layer on the vertical sides of said hole opening;

removing said passivation layer from said bottom of said hole opening, thereby exposing underlying said first metal layer;

forming a barrier layer over said substrate, including in said dual damascene structure;

depositing a second metal over said barrier layer in said dual damascene structure; and

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performing chemical mechanical polishing (CMP) to complete the forming of said
dual damascene structure.

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28. (AMENDED ONCE) The method of claim 13, wherein said barrier layer
comprises Ta, Ti, TaN, TiSiN, TaSiN, or WN.